

## WHAT IS CLAIMED IS

1. A process of forming a field emission electrode for manufacturing a field emission array, comprising steps of:
  - (a) providing a substrate having a metal layer thereon;
  - 5 (b) forming a plurality of mask units on said metal layer and partially removing said metal layer uncovered by said mask units;
  - (c) oxidizing a surface of the remained metal layer by an anodic oxidation method for forming a metal oxide layer thereon such that an upper portion of the unoxidized remained metal layer is in the shape of plural conoids; and
  - 10 (d) removing said remained mask units and said metal oxide layer.
2. The process according to claim 1, wherein said substrate is made of a material selected from a group consisting of plastic, quartz and glass.
3. The process according to claim 1, wherein said metal layer is selected from a group consisting of aluminum layer, tungsten layer, tantalum layer, molybdenum layer, molybdenum-tungsten alloy layer and molybdenum-tantalum alloy layer.
- 15 4. The process according to claim 3, wherein said metal layer is formed on said substrate by a method selected from a group consisting of electron gun evaporation, sputtering technique and heat coating technique.
- 20 5. The process according to claim 1, wherein said step (b) is performed by a photolithography technique and an etching method.
6. The process according to claim 5, wherein said etching method is selected from reactive ion etching method and wet etching method.
- 25 7. A process of forming a field emission electrode for manufacturing a field emission array, comprising steps of:

- (a) providing a substrate having a metal layer thereon;
- (b) forming a photoresist layer on said metal layer and removing a portion of said photoresist layer by a photolithography technique;
- (c) partially removing said metal layer uncovered by the remained photoresist layer;
- 5 (d) oxidizing a surface of the remained metal layer by an anodic oxidation method for forming a metal oxide layer thereon such that an upper portion of the unoxidized remained metal layer is in the shape of plural conoids; and
- 10 (e) removing said remained photoresist layer and said metal oxide layer.

8. The process according to claim 7, wherein said metal layer is selected from a group consisting of aluminum layer, tungsten layer, tantalum layer, molybdenum layer, molybdenum-tungsten alloy layer and molybdenum-tantalum alloy layer.

15 9. A process of forming a field emission electrode for manufacturing a field emission array, comprising steps of:

- (a) providing a substrate having a first metal layer thereon;
- (b) forming a plurality of mask units on said first metal layer and partially removing said first metal layer uncovered by said mask units;
- 20 (c) oxidizing a surface of the remained first metal layer by an anodic oxidation method for forming a metal oxide layer, . . . . .  
an upper portion of the unoxidized remained first metal layer is in the shape of plural cylinders;
- (d) forming a second metal layer on said metal oxide layer; and
- 25 (e) removing said remained mask units.

10. The process according to claim 9, wherein said substrate is made of a material selected from a group consisting of plastic, quartz and glass.

11. The process according to claim 9, wherein said first metal layer and said second metal layer are selected from a group consisting of aluminum layer, tungsten layer, tantalum layer, molybdenum layer, molybdenum-tungsten alloy layer and molybdenum-tantalum alloy layer.

5 12. The process according to claim 11, wherein said first metal layer is formed on said substrate by a method selected from a group consisting of electron gun evaporation, sputtering technique and heat coating technique.

10 13. The process according to claim 11, wherein said second metal layer is formed on said metal oxide layer by a method selected from a group consisting of electron gun evaporation, sputtering technique and heat coating technique.

14. The process according to claim 9, wherein said step (b) is performed by a photolithography technique and an etching method.

15 15. The process according to claim 14, wherein said etching method is selected from reactive ion etching method and wet etching method.

16. A process of forming a field emission electrode for manufacturing a field emission array, comprising steps of:

(a) providing a substrate having a first metal layer thereon;

20 (b) forming a photoresist layer on said first metal layer and removing a portion of said photoresist layer by a photolithography technique,

(c) partially removing said first metal layer uncovered by the remained photoresist layer;

(d) oxidizing a surface of the remained first metal layer by an anodic 25 oxidation method for forming a metal oxide layer thereon such that an upper portion of the unoxidized remained first metal layer is in the shape of plural chimneys;

(e) forming a second metal layer on said metal oxide layer; and  
(f) removing said remained photoresist layer.

17. The process according to claim 16, wherein said first metal layer and  
said second metal layer are selected from a group consisting of  
5 aluminum layer, tungsten layer, tantalum layer, molybdenum layer,  
molybdenum-tungsten alloy layer and molybdenum-tantalum alloy layer.